

REMARKS

Upon entry of this Amendment, claims 10-18 remain pending and under current examination. In the Final Office Action,¹ the Examiner took the following actions;

- (a) rejected claims 10-13, 15, and 16 under 35 U.S.C. § 102(b) as being anticipated by Kurosawa et al. (U.S. Patent No. 6,134,369) (“Kurosawa”)
- (b) rejected claims 10-13, 16, and 17 under 35 U.S.C. § 102(b) as being anticipated by Kosaka et al., *Photonic-Crystal Spot-Size Converter*, J. Appl. Phys. 76(3), pp. 268-270 (“Kosaka”);
- (c) rejected claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Kurosawa in view of Joannopoulos, *The Almost-Magical World of Photonic Crystals*, Brazilian J. Phys. 26(1), pp. 58-67 (“Joannopoulos”); and
- (d) objected to claim 18 as being dependent upon a rejected base claim, but would allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Applicants traverse the rejections for the following reasons.

Rejection of Claims 10-13, 15, and 16 under 35 U.S.C. § 102(b):

Applicants request reconsideration and withdrawal of the rejection of claims 10-13, 15, and 16 under 35 U.S.C. § 102(b) as being anticipated by Kurosawa. Applicants respectfully disagree with the Examiner’s arguments and conclusions.

In order to properly establish that Kurosawa anticipates Applicants’ claimed invention under 35 U.S.C. § 102, each and every element of each of the claims in issue must be found, either expressly described or under principles of inherency, in that single reference. Furthermore, “[t]he identical invention must be shown in as complete detail as is contained in the ... claim.” *See* M.P.E.P. § 2131, quoting *Richardson v. Suzuki Motor Co.*, 868 F.2d 1126, 1236, 9 U.S.P.Q.2d 1913, 1920 (Fed. Cir. 1989).

¹ The Office Action may contain statements characterizing the related art, case law, and claims. Regardless of whether any such statements are specifically identified herein, Applicants decline to automatically subscribe to any statements in the Office Action.

Kurosawa does not disclose at least Applicants' claimed "photonic crystal ... arranged so as to guide the optical beam coming from the first waveguide to the reflecting surface and to guide the reflected optical beam to the second waveguide" (amended claim 10).

Rather, Kurosawa discloses that the beam is guided in the L-shaped waveguide channel 211, and the photonic crystals 221, 223 are arranged externally the waveguide to define reflective surfaces suitable to reflect the beam from one arm of the L to the other arm of the L. *See* Figs. 2, 3 and col. 3, lines 29-31. Thus, Kurosawa does not disclose any device comprising Applicants' claimed "photonic crystal," defined such that "said photonic crystal is arranged so as to guide the optical beam coming from the first waveguide to the reflecting surface and to guide the reflected optical beam to the second waveguide" (amended claim 10).

Independent claim 10 is therefore allowable, and dependent claims 11-13, 15, and 16 are also allowable at least by virtue of their dependence from allowable base claim 10. Therefore, the 35 U.S.C. § 102(b) rejection of claims 10-13, 15, and 16 should be withdrawn.

Rejection of Claims 10-13, 16, and 17 under 35 U.S.C. § 102(b):

Applicants request reconsideration and withdrawal of the rejection of claims 10-13, 16, and 17 under 35 U.S.C. § 102(b) as being anticipated by Kosaka. Applicants respectfully disagree with the Examiner's arguments and conclusions.

Kosaka does not disclose at least Applicants' claimed "photonic crystal having a regular periodicity and having at least a first and a second crystal axes substantially aligned with said first and second directions, respectively" (claim 10). Specifically, Kosaka does not disclose the directions of the photonic-crystal spot-size converter in its Fig. 4.

In addition, Kosaka does not disclose at least Applicants' claimed "reflecting surface" (claim 10). Rather, the light input surface of Kosaka's photonic-crystal spot-size converter is not

a reflecting surface (which would have created a reflected beam in the opposite direction had it been a reflecting surface), and therefore Kosaka does not disclose “a reflecting surface delimiting said photonic crystal and so positioned and oriented as to reflect an optical beam coming from the first waveguide towards the second waveguide” (claim 10).

Moreover, Kosaka does not disclose at least Applicants’ claimed “photonic crystal ... arranged so as to guide the optical beam coming from the first waveguide to the reflecting surface and to guide the reflected optical beam to the second waveguide” (claim 10). Even assuming, for the sake of argument, that the tilted surface delimiting the photonic-crystal spot-size converter in Kosaka’s Fig. 4 is a reflecting surface, there is no photonic crystal guiding the light to the considered surface.

Independent claim 10 is therefore allowable, and dependent claims 11-13, 16, and 17 are also allowable at least by virtue of their dependence from allowable base claim 10. Therefore, the 35 U.S.C. § 102(b) rejection of claims 10-13, 16, and 17 should be withdrawn.

Rejection of Claim 14 under 35 U.S.C. § 103(a):

Applicants respectfully traverse the rejection of claim 14 under 35 U.S.C. § 103(a) as being unpatentable over Kurosawa in view of Joannopoulos. Applicants disagree with the Examiner’s arguments and conclusions, and submit that no *prima facie* case of obviousness has been established.

“To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on

applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)." M.P.E.P. § 2142, 8th Ed., Rev. 4 (October 2005), p. 2100-134.

A *prima facie* case of obviousness has not been established because Kurosawa and Joannopoulos, taken alone or in combination, do not teach or suggest each and every feature of Applicants' claims.

Applicants have already demonstrated previously herein that Kurosawa does not teach or suggest all the elements of independent claim 10. That is, Kurosawa does not teach or suggest at least Applicants' claimed "photonic crystal ... arranged so as to guide the optical beam coming from the first waveguide to the reflecting surface and to guide the reflected optical beam to the second waveguide" (amended claim 10).

In addition, as to dependent claim 14, the Examiner admitted that Kurosawa "fails to arrang[e] his waveguides 211 at [an] angle of $\pi/3$ as recited by claim 14" (Office Action, p. 5), and therefore applied Joannopoulos to teach "that [a] photonic crystal may be designed to guide guide [sic] light around a 60 degree angle (i.e., $\pi/3$) using a triangular lattice of air columns" (Office Action, pp. 5-6). The Examiner's application of Joannopoulos, however, fails to cure the deficiencies of Kurosawa already discussed. That is, Joannopoulos also fails to teach or suggest at least the above-quoted elements of independent claim 10.

Thus, even if Joannopoulos were combined with Kurosawa as the Examiner suggests, Kurosawa and Joannopoulos do not teach or suggest all elements recited in independent claim 10, and required by dependent claim 14. Therefore, the Examiner's application of Joannopoulos as an additional reference does not render obvious the recitations of Applicants' claim 14.

Accordingly, the Examiner's reliance on Kurosawa and Joannopoulos fails to establish *prima facie* obviousness of dependent claim 14. Dependent claim 14 is allowable at least by

virtue of its dependence from allowable base claim 10. The improper 35 U.S.C. § 103(a) rejection should be withdrawn.

Objected-to Claim 18:

Since Applicants have demonstrated above that independent claim 10 is allowable, dependent claim 18 is also allowable at least by virtue of its dependence from allowable base claim 10. Applicants request withdrawal of the objection.

Conclusion:

In view of the foregoing, Applicants request reconsideration of the application and withdrawal of the rejections. Because Applicants' amendments and arguments have removed all of the pending rejections, claims 10-18 are in condition for allowance, and Applicants request a favorable action.

If there are any remaining issues or misunderstandings, Applicants request the Examiner telephone the undersigned representative to discuss them.

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

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